

Serial No. 10/708,860  
Hiroyuki Akatsu et al.

This listing of claims replaces all prior versions and listings of claims in the application.

**In the Claims:**

1. (currently amended) A bipolar transistor, comprising:

a collector layer including an active portion having a relatively high dopant concentration and a second portion having a low dopant concentration of less than about  $5 \times 10^{16} \text{ cm}^{-3}$ ;

an epitaxial intrinsic base layer overlying said collector layer in conductive communication with said active portion of said collector layer;

a low-capacitance region laterally adjacent to said second portion of said collector layer including a dielectric region disposed in an undercut directly underlying said intrinsic base layer;

an emitter layer overlying said intrinsic base layer; and

a raised extrinsic base layer overlying said intrinsic base layer.

2. (currently amended) A bipolar transistor, comprising:

a collector layer;

an epitaxial intrinsic base layer overlying said collector layer;

a low-capacitance region laterally adjacent to said collector layer including a void disposed in an undercut underlying said intrinsic base layer, said void being either evacuated or filled with a gas;

an emitter layer overlying said intrinsic base layer; and

a raised extrinsic base layer overlying said intrinsic base layer.

Serial No. 10/708,860  
Hiroyuki Akatsu et al.

3. (currently amended) A bipolar transistor as claimed in claim 1, wherein said low-capacitance region includes at least one of a void and a solid dielectric region contacting second portion of said collector layer.

4. (original) A bipolar transistor as claimed in claim 3, wherein said intrinsic base layer is surrounded by said dielectric region.

5. (original) A bipolar transistor as claimed in claim 1, wherein said raised extrinsic base layer is self-aligned to said emitter layer.

6. (original) A bipolar transistor as claimed in claim 5, wherein said raised extrinsic base layer is spaced from said emitter layer by a first spacer having a sidewall wholly in contact with said raised extrinsic base layer and a second spacer overlying said first spacer, said second spacer having a sidewall wholly in contact with said emitter layer.

7. (currently amended) A bipolar transistor as claimed in claim 1, wherein said active portion of said collector layer has a dopant concentration of about  $10^{20}\text{cm}^{-3}$ .

8. (original) A bipolar transistor as claimed in claim 1, further comprising a subcollector disposed below said collector layer, and a trench isolation region surrounding peripheral edges of said subcollector.

9. (original) A bipolar transistor as claimed in claim 1, wherein said intrinsic base layer includes a layer of a single-crystal semiconductor material which forms a heterojunction with a material of at least one of said emitter layer and said collector layer.

Serial No. 10/708,860  
Hiroyuki Akatsu et al.

10. (original) A bipolar transistor as claimed in claim 1, wherein said single-crystal semiconductor material layer included in said intrinsic base layer includes silicon germanium.

11-20. (cancelled)

21. (currently amended) A bipolar transistor as claimed in claim 2, wherein said low-capacitance region further includes a solid dielectric region, wherein at least one of said void or said solid dielectric region contacts said second portion of said collector layer.

22. (previously presented) A bipolar transistor as claimed in claim 21, wherein said intrinsic base layer is laterally surrounded by said solid dielectric region.

23. (previously presented) A bipolar transistor as claimed in claim 2, wherein said raised extrinsic base layer is self-aligned to said emitter layer.

24. (previously presented) A bipolar transistor as claimed in claim 23, wherein said raised extrinsic base layer is spaced from said emitter layer by a first spacer having a sidewall wholly in contact with said raised extrinsic base layer and a second spacer overlying said first spacer, said second spacer having a sidewall wholly in contact with said emitter layer.

25. (currently amended) A bipolar transistor as claimed in claim 2, wherein said active portion of said collector layer has a dopant concentration of about  $10^{20} \text{ cm}^{-3}$ .

26. (previously presented) A bipolar transistor as claimed in claim 2, further comprising a subcollector disposed below said collector layer, and a trench isolation region surrounding peripheral edges of said subcollector.

Serial No. 10/708,860  
Hiroyuki Akatsu et al.

27. (previously presented) A bipolar transistor as claimed in claim 2, wherein said intrinsic base layer includes a layer of a single-crystal semiconductor material which forms a heterojunction with a material of at least one of said emitter layer and said collector layer.

28. (previously presented) A bipolar transistor as claimed in claim 2, wherein said single-crystal semiconductor material layer included in said intrinsic base layer includes silicon germanium.